

SECTION 02706 - UNDERGROUND PRESSURE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Furnishing and installation of underground pressure piping where shown on the Drawings and as listed in the Pipe Schedule in Section 02610.

1.02 RELATED SECTIONS

- A. Section 01666 - Pipe and Manhole Leakage Testing
- B. Section 02605 - Buried Pipe and Fittings
- C. Section 02315 - Excavation
- D. Section 02316 - Fill and Backfill
- E. Section 02317 - Trenching for Site Utilities
- F. Section 02901 - Restoration of Surfaces

1.03 SUBMITTALS

- A. See Section 01300
- B. Shop drawings showing proposed methods and procedures for connecting to existing pipelines.
- C. Shop drawings and catalog cuts for methods of anchoring pipe bends, if other than concrete reaction blocking is proposed.
- D. Shop drawings and catalog cuts of adapters for joining pipes of different materials and for caps and plugs at ends of pipelines.

1.04 QUALITY ASSURANCE

- A. Provide at least one person who shall be present at all times during the execution of this portion of the Work and who shall be thoroughly familiar with the types of materials being installed, pipe loadings and the material manufacturer's recommended methods of installation and who shall direct all work performed under this Section.
- B. Pipe installation shall be done by skilled workers and each pipe laying crew shall have a pipe laying foreman.
- C. Accurately install pipe to the lines, grades and depths designated on the Drawings. If no cover or grade is designated on the Drawings, the absolute minimum cover to finished grade shall be 6' in unpaved areas and 6' in paved areas.

- D. Deflections at joints, if approved by Engineer, shall be no more than one-half the manufacturer's recommended deflection.

1.05 HANDLING

- A. Carefully handle pipes and fittings when loading and unloading. Lift by hoists or lower on skidways in a manner to avoid shock and damage to the pipe.
- B. Use derricks, ropes or other suitable equipment for lowering pipe into trenches where required due to weight of material and for the safety and protection of workmen, materials, equipment, property and the Work.

1.06 VERIFICATION OF EXISTING PIPING

- A. Due to the uncertainty of exact locations and depths of existing underground pressure pipes, it is a condition of this Contract that each proposed point of connection to an existing pipe be excavated to verify the data contained on the Drawings.
- B. Prior to the installation of any piping in the vicinity of a required connection, carefully excavate in the area of the connection, locate the existing pipe, determine the centerline elevation of the pipe, and make measurements to adjacent valves and other items which may be in conflict with the Work.
- C. If the information found differs from that shown on the Drawings, submit the data to the Engineer at least 10 days prior to the anticipated date for making the connection and do not proceed with the connection until Engineer issues a Modification.

1.07 JOB CONDITIONS

- A. Obtain permission from the Owner prior to shutting off water service in a main. Coordinate with the Owner and take adequate precautions to insure maximum fire protection for the affected areas when water service is shut off.
- B. Obtain permission from private owners prior to shutting off a water service.
- C. In the event that a water main or water service must be shut off because of an accidental interruption, immediately notify Engineer and the Owner or private owner, as applicable, to make arrangements to restore service and to provide temporary service, if required.

- D. The Drawings indicate the required pipe sizes and locations of all piping, manholes, structures and appurtenances. Verify all locations and immediately notify Engineer of any discrepancies or conflicts.
- E. Approval of Engineer is required prior to changing the location of any of the Work due to field conditions. Changes in pipe sizes are prohibited without a written consent from Engineer.
- F. All installed piping shall form completely connected systems including connections to valves, equipment, structures, existing facilities and appurtenances specified in other Sections to result in a satisfactorily operating installation.

1.08 PROTECTION OF WATERLINES

- A. Water and wastewater lines located in the same area shall be installed in accordance with "Ten State Standards" for Water and Sewage Works.
- B. Parallel Water and Sewer Lines - Potable water lines and pipelines carrying sewage, sludge or other wastewater, whether treated or not, shall not be installed any closer than 10' horizontally from one another. If it is not absolutely possible to maintain this separation, the lines may be located as close as 3 feet horizontally from each other, provided that written approval has been obtained from the Department of Health and there is at least an 18" clear, vertical separation, with the sewer being below the water line.
- C. Water and Sewer Line Crossings - Whenever water and sewer lines must cross, the sewer must be situated below the water line with at least an 18" clear, vertical separation.
- D. Special Conditions - Parallel Lines - When it is impossible to achieve the requirements of Paragraph 1.07.B., immediately notify Engineer. If Engineer concurs, he may order the reconstruction of the existing sewer with ductile iron, mechanical joint pipe. The new line and the reconstructed line shall be pressure tested for leakage in accordance with Section 01666.
- E. Special Conditions - Crossing Lines - When it is impossible to achieve the requirements of Paragraph 1.07.C., immediately notify Engineer. If Engineer concurs, he will order 1) the water line raised, 2) the reconstruction of the sewer with ductile iron, mechanical joint pipe or, 3) the sewer line to be concrete encased.

- F. Water Lines Crossing Below Sewer - When it is impossible to achieve the requirements of any of the preceding paragraphs, immediately notify the Engineer. If Engineer concurs, he will order 1) the reconstruction of the sewer with ductile iron, mechanical joint pipe 2) the lowering of the water line to obtain a vertical separation of 18" between the bottom of the sewer and the top of the water line 3) the sewer line supported by the concrete cradle and 4) the water line be centered under the sewer to maximize the distance from the sewer to the nearest joint. The sewer and water lines shall be pressure tested for leakage in accordance with Section 01666.
- G. Additional work ordered under Paragraphs 1.07.D., E., and F. will be covered by a Change Order.

PART 2 PRODUCTS

2.01 PIPE AND PIPE FITTINGS

- A. Materials are specified in Section 02605.

2.02 VALVES AND VALVE BOXES

- A. Types are listed in Section 02641.

2.03 CONCRETE FOR PIPE ENCASEMENTS AND CRADLES

- A. Class C concrete (2,000 psi) as specified in Division 3.

2.04 PIPE BEDDING

- A. Specified in Section 02317.

2.05 CONNECTIONS TO EXISTING PIPELINES

- A. Use fittings and adapters as shown on the Drawings. Where no details of the connections are shown, submit a proposal, for acceptance, showing all fittings, adapters and procedures to be used.

2.06 PIPE ADAPTERS

- A. Join pipes of different materials with adapters specially manufactured for that purpose and acceptable to Engineer. Use Hymax fittings/couplings or approved equal.
- B. All tees and gate valves shall be connected with Foster Adapters (to eliminate short spool piece of pipe between fittings).

2.07 UNDERGROUND WARNING TAPE

- A. Tape - Inert plastic film or bonded layer plastic with a metallized foil core. Brightly colored.
- B. Markings - Imprint identifying the type of line buried below.
- C. Manufacturers - Griffolyn Company, Inc., P.O. Box 33248, Houston, Texas; Lineguard Manufacturer, P.O. Box 426, Wheaton, Illinois, or approved equal.

2.08 TIE ROD PIPE JOINT RESTRAINT SYSTEM

- A. Tie rod system shall consist of stainless steel rod.

2.09 CONDUCTIVITY SYSTEM

- A. Electric conductivity shall be provided for ductile iron pipe and fitting by means of bronze wedges, retainer glands or conductivity strips. Pipe 4-inch and less, two (2) bronze wedges at opposite sides of the pipe. Larger pipe, install four (4) bronze wedges, in pairs.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that points of connections to existing pipes have been excavated, elevations taken and given to Engineer, and Engineer has issued an authorization to proceed with the work as shown, or with modifications.
- B. Verify that trench conditions and pipe bedding are properly provided in accordance with Section 02221.
- C. All pipe and fittings shall be in full compliance with these Specifications.
- D. Reinspect each length of pipe, fittings and joints and remove from the Project site any damaged or defective materials.
- E. Do not install pipe until conditions are satisfactory.

3.02 PREPARATION

- A. Thoroughly clean interiors of pipes, fittings and appurtenances, joint surfaces, and gaskets prior to installation.

3.03 PIPE INSTALLATION - GENERAL

- A. Carefully lower pipes and fittings into the trench. Apply joint lubricant in accordance with the approved manufacturer's recommendations. Join pipe section and fittings.
- B. Select pipe and fittings so that there will be as small a deviation as possible at the joints and so that inverts present a smooth surface. Pipe and fittings which do not fit together to form a tight fitting joint are not permitted.
- C. Use only mechanical cutters for cutting pipe.
- D. Install pipes to the required lines and grades using an accepted method of control. Engineer reserves the right disallow a method of control, including those previously accepted, if, in Engineer's opinion, the method of control is not providing the accuracy required under the Contract.
- E. Maintain cleanliness of installed pipe and fitting interiors throughout the Work. Plug ends when pipe installation is not in progress so that dirt, foreign matter, water, animals and people do not enter the pipe. Drainage of construction excavations through installed pipes is not permitted.
- F. Make connections between pipes of different materials with approved adapters. The encasement of adaptor made connections with concrete is not permitted.
- G. Install pipe with plain ends pointing in the direction of the flow.
- H. Dead ended lines shall be fitted with approved watertight plugs or caps specially manufactured for that purpose.
- I. Commence pipe laying at the lowest point, with the spigot ends pointing in the direction of flow.
- J. Install "underground warning tape", as shown on the drawings. Position marker directly above and parallel with the pipe with the printed side up.

3.04 ANCHORING PRESSURE PIPES

- A. Anchor all tees, dead ends, hydrants and bends deflecting

22½ or more. Anchor by means of any of the following:

1. Precast concrete reaction blocking, as detailed on the Drawings (i.e., cast-in-place thrust blocking is not acceptable).
2. Mechanical joint retainer at fitting and all pipe joints within three pipe lengths on each side of fitting.
3. Locked or restrained mechanical joints at fittings and all pipe joints within three pipe lengths on each side of fitting. In addition, the class of pipe shall be increased so that the required class of pipe specified is achieved under the groove.
4. Stainless steel metal harness and stainless steel tie rods at fittings and all pipe joints within three pipe lengths on each side of fitting.

3.05 CONNECTION TO EXISTING PIPELINES

- A. Connect to existing pipelines in accordance with the Drawings, or subsequently issued Modifications.
- B. Do work at such times and in a manner to cause a minimum of interruption to existing services.
- C. Provide necessary adapters and specials required to make the connections.

3.06 WATER SERVICE TAPS

- A. Provide water service taps to all buildings indicated on the Drawings unless noted otherwise. Service taps shall be as detailed on the Drawings and as herein specified for appropriate pipe materials.
- B. Ductile Iron Pipe - In accordance with AWWA C151.
- C. PVC Pipe - 1-inch and less, bronze tapping saddles, with stops, made especially for tapping PVC. Greater than 1-inch use tee or wye with reducer.

3.07 PIPE CONNECTIONS TO STRUCTURE

- A. All pipes connecting to manholes or other structures shall be connected as shown on the Drawings or as specified in other Sections.

3.08 CONCRETE ENCASEMENT AND CRADLES

- A. Encase pipe in concrete where shown on the Drawings.

- B. Encase pipe in concrete at utility crossings where required and in accordance with the detail shown on the Drawings.
- C. Provide concrete cradles where shown on the Drawings.
- D. Provide additional concrete encasements and cradles where directed by Engineer.
- E. The configurations, dimensions and limits of concrete are shown on the Drawings.

3.09 DISINFECTION

- A. Disinfect all water lines, services, valves, hydrants and appurtenances installed under this Section.
- B. Disinfect all existing water lines, services and appurtenances which were broken, damaged, contaminated or suspected of being contaminated.
- C. Disinfection shall comply with AWWA C651.

3.10 FIELD QUALITY CONTROL

- A. Afford Engineer access to the Work so that he may spot check the installations, or check each length of pipe immediately after it has been installed, or check it at any time after installation.
- B. Inspect pipe joints and verify that they have been properly installed and made up, and free from sags, high spots, and excessive deflections.
- C. Perform leakage tests in accordance with Section 01666 and make any repairs and replacements necessary to meet the stipulated limits.

3.11 ADJUSTING AND CLEAN

- A. Any section of piping that is found defective in material, alignment, grade, joint or otherwise, shall be corrected.
- B. In the event that dirt, debris or any other foreign material has entered any portion of the piping, flush the piping with clean water. Continue the flushing process until the piping is clean, as determined by Engineer.

3.12 WATER SERVICE CONNECTION RECORDS

- A. Install building connections at all buildings indicated by a symbol on the plan and/or profile as described in the General Legend and as detailed on the Drawings. The Engineer will determine the actual location of building connections in the field on the basis of the most

convenient and economical location to provide water service to each structure or lot to be serviced. When locations are determined in the field, they will be provided to the Contractor in advance of the pipe laying.

- B. Horizontal Ties - Measure and record 3 ties to the curb stop and to the end of each water service. When possible, these ties shall be to the building to be served by the service; otherwise, to permanent, physical objects on the same side of the street as the end of the water service.
- C. Vertical Ties - Measure the depth of each water service and record. Depths shall be measured from the pipe centerline to ground surface. Also, provide centerline elevations, using the same datum as that used on the Drawings. Accuracy of vertical measurements shall be plus or minus 1".
- D. Corporation and Curb Stops - Record the pipe station for each corporation stop installed.
- E. Other Recordings - Record length of each water service and other pertinent information, as required on the SKETCH OF WATER SERVICE CONNECTION.
- F. Records - Clearly and legibly record the above data on a SKETCH OF WATER SERVICE CONNECTION form. Submit duplicate copies of records to Engineer's field office within 48 hours after water services are installed.

END OF SECTION